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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/930,989	08/17/2001	Takashi Shimazu	110389	1772

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EXAMINER
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BELL, BRUCE F

ART UNIT	PAPER NUMBER
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1746

DATE MAILED: 12/03/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

058

# Office Action Summary

Application No.

09/930,989

Applicant(s)

SHIMAZU ET AL.

Examiner

Bruce F. Bell

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-55 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,21-24,26,27,31-34,37-49 and 51-55 is/are rejected.
- 7) ☒ Claim(s) 2-20,25,28-30,35,36 and 50 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 17 August 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.  
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 4. 6) ☐ Other: \_\_\_\_

### **DETAILED ACTION**

The examiner in charge of this application has determined that the applicant's restriction requirement was improper and therefore has acted on all of the claims in the application. The office action follows.

#### ***Claim Objections***

1. Claims 2-20, 28-30 are objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim.

Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Claim 2 recites that the fuel decomposition is done by pyrolysis but just putting a method to how something is performed in an apparatus claim has no further narrowing of the apparatus claim as set forth, since no apparatus limitations are used to narrow such claims.

Apparatus claims recite features where as method claims recited steps, therefore applicant is requested to narrow the instant claim by virtue of an apparatus feature rather than by a means by which the decomposition is perform. Claims 3-20, 28-30 depend on claim 2 and therefore have the same defect.

Correction and clarification are requested.

2. Claims 24, 25, 35, 36 and 50 are objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Claims 24, 25, 35, 36 and 50 do not further limit the apparatus features of the fuel reforming

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apparatus. Recitation to the type of fuel being utilized does not change the overall structure of the apparatus as set forth in the instant claims. A dependent limitation must further limit the structure of the device being instantly claimed.

***Claim Rejections - 35 USC § 102***

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

4. Claims 1, 22, 24 and 51 are rejected under 35 U.S.C. 102(a) as being anticipated by Christensen (6375916).

Christensen disclose a process and system for the preparation of hydrogen rich gas by passing a hydrocarbon feedstock through a reactor containing a steam reforming catalyst to remove or reduce the contents of higher hydrocarbons in the feedstock and then passing the effluent from the first reactor to a catalytic autothermal reformer (ATR) and withdrawing from the autothermal reformer a product rich in hydrogen gas. See abstract. The patent shows that the feedstock used is a natural gas that is desulfurized before entering the ATR. See Example 1.

Christensen anticipates the applicants' instant claims as set forth as shown by the disclosure above.

***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1, 21-23, 26, 27, 31-34, 37-49, 51-55 are rejected under 35 U.S.C. 103(a) as being unpatentable over Clawson et al (6126908) in combination with Acker (6322917).

Clawson et al disclose an apparatus for converting hydrocarbon fuel into hydrogen gas having a first vessel having a partial oxidation reaction zone and a separate steam reforming reaction zone that is distinct from the partial oxidation reaction zone. The reformer has a helical tube extending from the partial oxidation reaction zone vessel. The helical tube has a first end connected to an oxygen containing source and a second end connected to the partial oxidation reaction zone. Oxygen gas from the source can be directed through the tube to the reaction vessel. A second vessel is annularly disposed about the first vessel. The helical tube is disposed between the first and second vessels and gases from the first vessel are directed through the second vessel. See abstract. The first tube receives a first mixture of an oxygen containing gas and a first fuel. The first tube outlet conducts a first reaction reformat of the first mixture. The second tube receives a second mixture of a second fuel for conducting a second reaction reformat. A catalyst reforming zone is annularly disposed around the second tube. See col. 2, lines 17-29. The apparatus can be used

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for hydrocarbon fuels such as gasoline, methanol and ethanol. The partial oxidation reaction zone allows the fuel to partially burn while not forming soot and while providing heat to the steam reforming zone and the other portions of the reactor annularly disposed around the partial oxidation zone. See col. 2, line 63 – col. 3, line 3. The apparatus further as a high temperature shift zone for sulfur removal which includes a catalyst to reduce the amount of hydrogen sulfide in the gas stream. See col. 4, line 44-48. The method in which the apparatus works is also disclosed at col. 5, line 31 – col. 6, line 40.

The prior art of Clawson et al does not disclose that the system has a controller for controlling reaction conditions in the fuel decomposition unit and further does not disclose a decomposition unit.

Acker disclose a method for controlling the preferential oxidation of CO in a reformed fuel gas stream which includes a controller (memory) for adjusting the amount of air supplied to the reactor. See abstract and Figure 1. A fuel conditioner including a reformer, a shift reactor, and PROX reactor are disclosed. A series of valves and blowers are disclosed to regulate the flow rates of fuels, steam and air into the conditioning unit and each blower and valve is controlled by a central processing unit which monitors power demand and certain operating conditions of the fuel cell. See col. 6, lines 27-66.

The subject matter as a whole would have been obvious at the time the instant invention was made to have taken the device of Clawson and add the control mechanisms of Acker for the purpose of being able to more accurately control the rate

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and the amount of the reaction materials entering into the fuel reforming stages for the purpose of increasing the efficiency and out put of pure hydrogen that goes to the fuel cell. Even though the prior art of Clawson does not show a decomposition unit, Clawson does disclose a partial oxidation reaction zone which the examiner contends is the same as a decomposition unit since it breaks the components of the gas down into lower hydrocarbons, therefore it appears that the decomposition unit has been met by the prior art device. The controlling mechanism of Acker shows that it is capable of introducing the stream and air components to each section of the conditioning system for the purpose of reacting the gaseous components to form the hydrogen gas needed to supply the fuel cell. Therefore, the prior art of Clawson in combination with Acker renders the applicants' instant invention obvious for the reasons set forth above.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Bruce F. Bell whose telephone number is 703-308-2527. The examiner can normally be reached on Monday-Friday 6:30 AM - 3:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Randy Gulakowski can be reached on 703-308-4333. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9310.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.

BFB

  
Bruce F. Bell

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December 1, 2003

Primary Examiner  
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